

CLAIMS

1. A phase error correction circuit comprising:

a complex phase rotator for multiplying an input VSB (vestigial-sideband) signal by a phase correction signal and outputting a resultant signal;

5 a specific frequency component elimination filter for eliminating a specific frequency component from the signal output from the complex phase rotator and outputting a resultant signal;

a waveform equalizer for performing waveform distortion correction to the signal output from the specific frequency component elimination filter and outputting a resultant
10 signal; and

a phase correction signal generator for detecting a phase error based on the signal output from the waveform equalizer and outputting a complex signal corresponding to the detected phase error as the phase correction signal.

15 2. The phase error correction circuit of claim 1, wherein the waveform equalizer receives a complex signal from the specific frequency component elimination filter and outputs a real signal as the resultant signal obtained from the waveform distortion correction.

20 3. The phase error correction circuit of claim 2, wherein the phase correction signal generator includes a Hilbert transformer for performing Hilbert transform to the signal output from the waveform equalizer and outputting a complex signal obtained from the Hilbert transform and detects the phase error based on the Hilbert-transformed complex signal.

4. The phase error correction circuit of claim 3, wherein the phase correction signal generator further includes:

a phase error detector for detecting the phase error based on the Hilbert-transformed complex signal and outputting the detected phase error;

5 a low pass filter for smoothing the detected phase error output from the phase error detector and outputting the smoothed signal; and

a complex signal generator for generating a complex signal corresponding to the signal output from the low pass filter and outputting the generated complex signal as the phase correction signal.

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5. The phase error correction circuit of claim 4, wherein the phase error detector includes:

a slicer for estimating an original signal symbol value of the VSB signal from an in-phase component of an input complex signal;

15 a subtracter for obtaining a difference between an in-phase component of the Hilbert-transformed complex signal and the estimated signal symbol value output from the slicer; and

an integrator for obtaining a product of the difference output from the subtracter and a quadrature component of the Hilbert-transformed complex signal and outputting a
20 resultant product as the phase error.

6. The phase error correction circuit of claim 3, further comprising a small phase error corrector for detecting a phase error based on the Hilbert-transformed complex signal, performing correction of the phase error of the Hilbert-transformed complex signal
25 according to the detected phase error, and outputting a phase-corrected signal.

7. The phase error correction circuit of claim 6, wherein the small phase error corrector includes:

a small complex phase rotator for multiplying the Hilbert-transformed complex
5 signal by a small phase error correction signal and outputting a resultant signal;

a phase error detector for detecting the phase error based on the signal output from the small complex phase rotator and outputting the detected phase error;

a low pass filter for smoothing the detected phase error output from the phase error detector and outputting the smoothed signal; and

10 a complex signal generator for generating a complex signal corresponding to the signal output from the low pass filter and outputting the generated complex signal as the small phase error correction signal.

8. The phase error correction circuit of claim 1, wherein the specific frequency
15 component elimination filter has a narrow band elimination filter for eliminating a specific frequency component.

9. The phase error correction circuit of claim 8, wherein the narrow band elimination filter eliminates a component of a carrier frequency in a NTSC (national
20 television system committee) signal.

10. The phase error correction circuit of claim 8, wherein the narrow band elimination filter eliminates a direct current component.

25 11. The phase error correction circuit of claim 1, wherein the specific frequency

component elimination filter has a narrow band elimination filter of which an elimination frequency band is variable.